

Harry Potter

A HISTORY OF MAGIC



*A JOURNEY
THROUGH*

Divination &
Astronomy

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A JOURNEY THROUGH
Divination & Astronomy

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INTRODUCTION TO THE SERIES

The history of magic is as long as time and as wide as the world. In every culture, in every age, in every place and, probably, in every heart, there is magic.

This series of eBooks will reveal the world of magic and unlock its secrets. It will go back thousands of years. It will travel to the far corners of the world. It will reach the stars. It will explore under the earth. It will decipher mysterious languages. We'll encounter some of the most colourful characters in history. We'll discover the curious incidents and truth behind legends. We'll see how, in the quest to discover magic, practitioners laid the foundations of science.

This series, structured around lessons from the Hogwarts curriculum, will show how this long and rich history has nourished the fictional world of Harry Potter.

The starting point for these eBooks was the exhibition *Harry Potter: A History of Magic*, which opened at the British Library in October 2017, twenty years after *Harry Potter and the Philosopher's Stone* was first published in the UK in 1997. For the exhibition, curators spent over a year searching through the 150 million items that the British Library holds to find the most magical. Then they sourced special artefacts to be loaned from other notable institutions. In October 2018, the New-York Historical Society took on the British Library exhibition, adding books and artefacts from their own collection, as well as other fascinating loans.

This series of four eBook shorts contains worldly wonders from both exhibitions, exploring J.K. Rowling's magical inventions alongside their cultural and historical forebears. Throughout are links between ours and the wizarding world, told through extraordinary stories from the history of magic.



DIVINATION

Wanting to see into the future seems to be built into human nature. The person who knows their future can control it, and become the commander of their destiny. Some of the most prized magical objects have been tools for divination and attempting to see the future. People who are purported to have second sight have been consulted by everyone, from celebrities to shoe sellers.

If you can see the future (and, quite frankly, if you can't), you'll have seen that we are about to enter the world of prediction, fortune-telling and the Hogwarts subject of Divination. The practice of divination stretches back thousands of years, and has used natural instruments like bones and turtle shells. More recently, it had a renaissance in the front parlours of Victorian England, using everyday objects like teacups for peering into the future. Some people will use anything to see what fate and fortune holds!



PART 1: FROM RUNES TO ORACLE BONES

So you have chosen to study Divination, the most difficult of all magical arts. I must warn you at the outset that if you do not have the Sight, there is very little I will be able to teach you. Books can take you only so far in this field...'

Professor Trelawney – *Harry Potter and the Prisoner of Azkaban*

In 19th-century Siam (now Thailand), important life choices were made by consulting a divination manual called a *phrommachat*. It couldn't be read by just anyone – it had to be taken to a divination specialist called a Mor Doo to be interpreted.

Because the manuals were used so much, they were often worn out and recopied multiple times, which makes dating their use in history quite difficult. The oldest known copies are from the 18th century, but parts of the manuals were probably adopted when Buddhism was introduced in mainland Southeast Asia, about a thousand years ago. Their Hindu and Chinese elements might date them to even before that.

In a typical *phrommachat* the paper was concertinaed, and accordingly it was called a folding book. It would have been handwritten in ink and would typically have contained wonderful illustrations of courting couples, big cats and men riding an assortment of animals: chickens, dragons and elephants. The Mor Doo was needed to interpret the multiple belief systems that were merged in the book, requiring both literacy and numeracy to do so.

For Buddhist monks leaving the order, a career as a Mor Doo was a viable way of casting yourself as a lay specialist with access to the necessary secret knowledge the job required. There are links with Hindu and Indian traditions, and the zodiac employed in the manuals is derived from Chinese tradition.

Like Southeast Asia and Thailand itself, the manuals reflect a melting pot of traditions and cultures.

When would you consult your Mor Doo? For any difficult decision that had to be made, or for a major life choice, a trip to the Mor Doo was in order: questions might include whether to marry someone, start a business or build a new house, and if so where to build it. Travelling was dangerous back then, so people would even consult on taking trips. Falling ill was seen as a symptom of mental sickness as much as physical. Emotional strains on relationships could all add up to making someone ill, so the Mor Doo consulted on how to sort out issues with relationships in the community. Feelings of guilt and remorse, or any extreme emotions, were thought to make one sick. A divination specialist would tell you exactly what to do.

How the Mor Doo would interpret the book is complex. The twelve animals in the zodiac were combined with five elements: water, fire, earth, wood and metal. And multiplied together, this would give you sixty possible years. To make it more complicated, each of these sixty years was combined with a female or male avatar, or sometimes a different figure, to take it to 120 options. The idea was that you could determine someone's birth year within the range of 120 years, and if you added the reign of a king, you could hone in on which particular year was mentioned.

Since the minefield of relationships was one of the main reasons why people consulted a Mor Doo, there was even a special relationship section. Matchmaking and checking the future compatibility of two individuals in a relationship (particularly marriage) would warrant seeing the Mor Doo. And not just for the individuals concerned, but both families, too – it was a family affair.



They hurried back down to the Gryffindor common room, which was half-empty, and joined Hermione, who was sitting alone, reading a book called Ancient Runes Made Easy.

Harry Potter and the Chamber of Secrets

Runes were an ancient Germanic writing system – the earliest runic inscriptions date from around 150 AD. As Christianity spread, the characters were replaced by the Latin alphabet. After the early 16th century, runes were no longer in practical use, but their association with magic continues. Famously, *The Tales of Beedle the Bard* – the children’s book for wizards first mentioned in *Harry Potter and the Deathly Hallows* – was written in runes. The need to interpret runes (and the difficulty in doing so) means they have an air of magic and secret knowledge surrounding them. Even the root of the word ‘rune’ means secrecy. They have come to be very powerful symbols, associated with Odin in Norse mythology.



Some think that runes actually started as symbols of magic and developed into a writing system. They aren't curved letters like the Latin alphabet, as they were made for carving into hard surfaces, especially wood and even antlers. Antlers also have magical associations, so the combination of runes and antlers is particularly potent.

Antlers grow above the head and so connect the head with a higher power. Stags shed and regrow them, suggesting the powerful symbolism of renewal, rebirth and regeneration. Using antlers to make divination discs with runes inscribed on them would draw on the power of nature in the antler and the rune itself, allowing you to interpret the future or your situation.

The people who were engaging with runes before the Enlightenment (the period during the late 17th and early 18th century in Europe, also known as the Age of Reason) saw magic everywhere. But runes have continued to be used long after the Enlightenment, too. Runes on antler discs were still being made in the late 20th and early 21st century, and have been used by practising witches. They show that magic is still very much part of our culture today.

'So these are children's stories?' asked Hermione, bending again over the runes.

'Yeah,' said Ron uncertainly. 'I mean, that's just what you hear; you know, that all these old stories came from Beedle. I dunno what they're like in the original versions.'

'But I wonder why Dumbledore thought I should read them?'

Harry Potter and the Deathly Hallows



'I what dragons?' spluttered the Prime Minister.

Harry Potter and the Half-Blood Prince

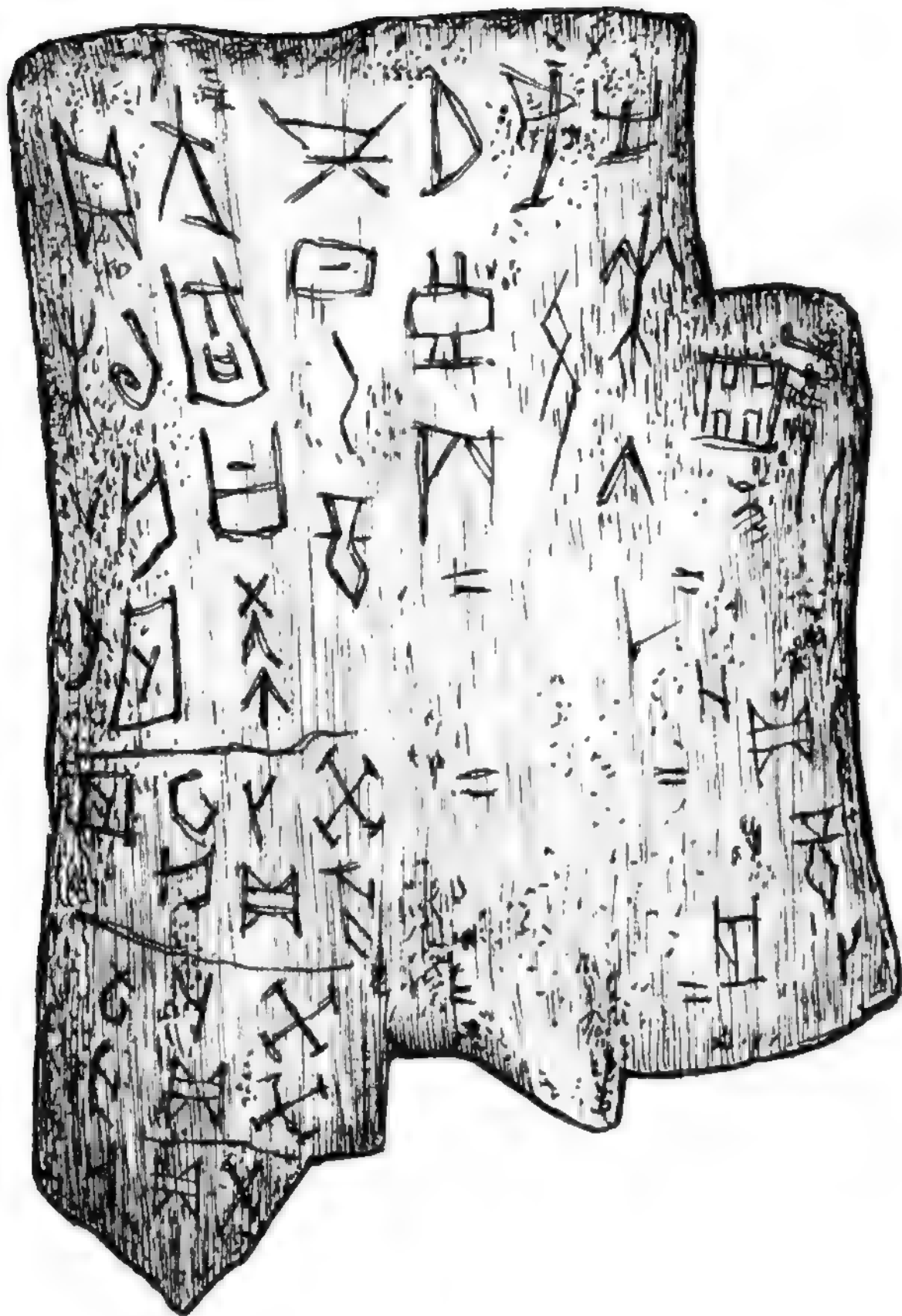
For hundreds of years, farmers in Eastern China occasionally dug up bones and bits of turtle shell that had strange writing on them. Until the 19th century they just reburied them, thinking nothing of it. After that, a belief spread that they had magical properties and were referred to as ‘dragon bones’, or ‘oracle bones’. They were ground down and ingested as medicine.

Legend has it that Wang Yirong, the chancellor of the Imperial Academy in Beijing, was ill with malaria and was presented with some whole medicinal bones to aid his recovery. Before they got ground into powder, he saw the unusual markings and recognised them as ancient writing. This might not be true, but in 1899 Yirong was credited with recognising the true significance of the dragon bones.

They are truly ancient: the use of oracle bones predates the three major religions of China (Confucianism, Taoism and Buddhism) by almost a thousand years. The discovery of the bones was one of the greatest archaeological finds in history, because it proved there had been an advanced ancient civilisation in China that had a highly developed writing system, called the Shang.

The ancient Shang people were a cult who worshipped the spirits of their ancestors, and they used the oracle bones as a means of communicating with those spirits. These spirits were thought to be highly temperamental (like the Olympian gods), so, according to the Shang people, they weren’t always benign and had to be pacified. They were fawned upon, calmed by ritualistic wines and could wreak havoc upon your fortunes if you stepped out of line.

The Shang kings communicated with their ancestors using a turtle shell or the shoulder blade of an ox. The process of preparing the bones was performed by skilled diviners. The first stage involved cleaning the bones – clearing off the flesh, which could take up to two or three weeks. If you went to the butcher today, trying this on your own might take a month, and there would still be imperfections.



The bones would then be anointed by blood (often perceived as a medium for communicating with the dead), and then turned over to have holes drilled or chiselled into them. On the other side to the holes, the bone was inscribed with information, such as the date and name of the diviner, and most importantly, a question. Communicating with the ancestors could now truly begin.

The questions usually followed a yes or no format. They could range from the profound to the mundane. One example of the latter was a king asking whether the severe toothache he had been suffering from had been caused by the displeasure of a particular ancestral god. To get an answer, it was customary that intense heat (probably in the form of a metal rod) was inserted into the different holes. The heat would cause cracking. The cracks are the ancestors answering the question.

Looking back at the archaeological record, it isn't easy at first glance to distinguish cracks that appear naturally from those created deliberately, especially on ancient bones and brittle materials like turtle shells. But many of the oracle bones have the actual answer carved on to the front part of the surface where the question was posed, and archaeologists can see the interpretation of the crack in question.

Divination was not for common people. Diviners were esteemed members of the court who worked for the king, and later in the dynasty the king himself became the sole diviner. He was head shaman, political ruler and paramount religious leader. As the only one with access to the ancestors, his word was unquestioned.

The bones and turtle shells weren't thrown away after use, but carefully stored. The storage of the bones acted as a database, like a cloud-based management system in computing today. As much as they are artefacts of magic and divination, for archaeologists, historians and academics their significance is that they constitute the earliest evidence of an advanced writing system in ancient China. They now pore over fragments of bone and shell that were once used as medicine, and in China, there are even university courses dedicated to them.

In the case of the oracle bones kept at the British Library, rather than dating the bones to within a few centuries, experts were able to date them almost to an exact day. One of the bones documented a lunar eclipse, and an astronomer used a NASA model which allows lunar and solar eclipses to be tracked back through time. Knowing the lunar eclipse could be seen from Anyang, the

capital of the Shang dynasty, the astronomer was able to date the bone to 27 December 1192 BC, when the lunar eclipse would have been visible in that location.

Bones that were created to reveal the future, are now revealing the past.



PART 2: CRYSTAL BALLS, POSSESSED MIRRORS AND A FRAGRANT WITCH

‘Where is she?’ Ron said.

A voice came suddenly out of the shadows, a soft, misty sort of voice.

‘Welcome,’ it said. ‘How nice to see you in the physical world at last.’

Harry Potter and the Prisoner of Azkaban

At Hogwarts, Divination was not always held in the greatest esteem, and neither was its teacher, Professor Sybill Trelawney. Many saw Professor Trelawney as a bit of a fraud, especially Hermione. The teacher did have flashes of true clairvoyance, but they often escaped her memory.

‘My name is Professor Trelawney. You may not have seen me before. I find that descending too often into the hustle and bustle of the main school clouds my Inner Eye.’

Professor Sybill Trelawney – *Harry Potter and the Prisoner of Azkaban*

Professor Trelawney herself might not have believed she had the ability to see into the future, but there have been real examples of people who certainly

did. Over five hundred years ago in a cave on the banks of the River Nidd in Yorkshire in northern England, a fifteen-year-old girl gave birth. The mother was rumoured to have been subsequently hidden away in a nunnery or to have died in childbirth, but the child survived.

The little girl grew up around the village of Knaresborough and was taunted and mocked because of her strange ways and unconventional looks. She had a bent back, a long and crooked nose, her head was too large and her eyes too wide: the overriding impression was that she looked like a witch. Rejected by society, she retreated to the cave where she was born and studied the forest, making potions from plants and herbs. She made her living by divining the future and acquired a reputation for her extraordinary visions. She became known as Mother Shipton, the Yorkshire Prophetess.

She was said to have warned of the Spanish Armada, to have predicted the great plague in London, to have had visions of vast iron-hulled ships and to have seen the coming of the end of the world. That's the story, but there is no solid evidence of her existence when she was supposed to have lived in the 16th century, so many think she is just that: a story.

Nonetheless, Mother Shipton became hugely famous. The legends increased in number and spread widely: she could levitate; she could summon goblins; she was born with a full set of teeth and the tusks of a boar; she escaped a courtroom on a dragon; her father was actually the devil...

As well as pubs being named after her and fortune-tellers plying their trade under the gaze of her effigy, since the mid-17th century there have been more than fifty different books written about her and her prophecies. The first books appeared around the time of the English Civil War, eighty years after she was supposed to have died. *Mother Shipton Wonders!!! Past, Present, and to come; being the strange prophecies and uncommon predictions of the famous Mother Shipton* was published in 1797, with a striking image of her with scroll in hand and finger raised as if in mid-prophecy. It was one of a large number of cheap, pamphlet-type publications that indicate she was a folk figure, and a popular one at that. The image of her with a hooked nose, pointy hat and even a wisp of a beard is typically representative of a witch.



THE FAMOUS MOTHER SHIPTON

(Published as the Act directed by Samuel Baker. Aug '9197)

One of the most famous publications about Mother Shipton was written by William Henry Harrison, a bookseller from Brighton, and was released in 1881, three hundred years after she was supposed to have died. It grabbed the public's imagination, since it supposedly contained a long poem of extra prophecies that Harrison said he'd uncovered from a manuscript in the British Museum. Appearing alongside a number of things that had since come to pass – which Harrison credited as Mother Shipton prophecies – was the idea that the world was about to end. Mother Shipton's apparent success in predicting the future made this prophecy seem particularly convincing – until Harrison confessed he had made it up.

Mother Shipton lives on in the imagination, though, and books continue to get written about her today. She even has her own statue, luring tourists to Knaresborough with tales of the Yorkshire Prophetess.



Scrying is something you may not have heard of, but it is actually another way of divining the future – the word has its root in the old English word meaning ‘to catch sight of’. Some scry by gazing into the flames of a fire, others the smoke. Some divine the future from peering into the clouds. The famous 16th-century French scryer Nostradamus used a simple bowl of water. Looking at reflections and interpreting the ripples of water was an early form of divination.

A self-proclaimed neo-pagan witch of the 20th century called Cecil Williamson had a witch's scrying mirror. It is about half a metre high and a quarter of a metre wide, with a frame of dark wood. At the top is the face of a witch with the requisite long, hooked nose, bushy eyebrows, wild hair and piercing eyes, all crowned with a witch's pointy hat. The sides of the mirror look like bony arms and legs.



Williamson was the founder of the Museum of Witchcraft in Boscastle, Cornwall, and his mirror was one of a quite popular design in the early 20th century. A familiar spirit (a ghost that accompanies you) is supposed to be conjured and only seen in the mirror. If you are unfortunate enough to catch a glimpse of someone standing behind you as you gaze into the mirror, it is imperative that you don't turn around in case the being persists in front of your eyes. Talk quietly to the figure in the mirror, or close your eyes, but never look behind you!

He whirled around. His heart was pounding far more furiously than when the book had screamed – for he had seen not only himself in the mirror, but a whole crowd of people standing right behind him.

Harry Potter and the Philosopher's Stone



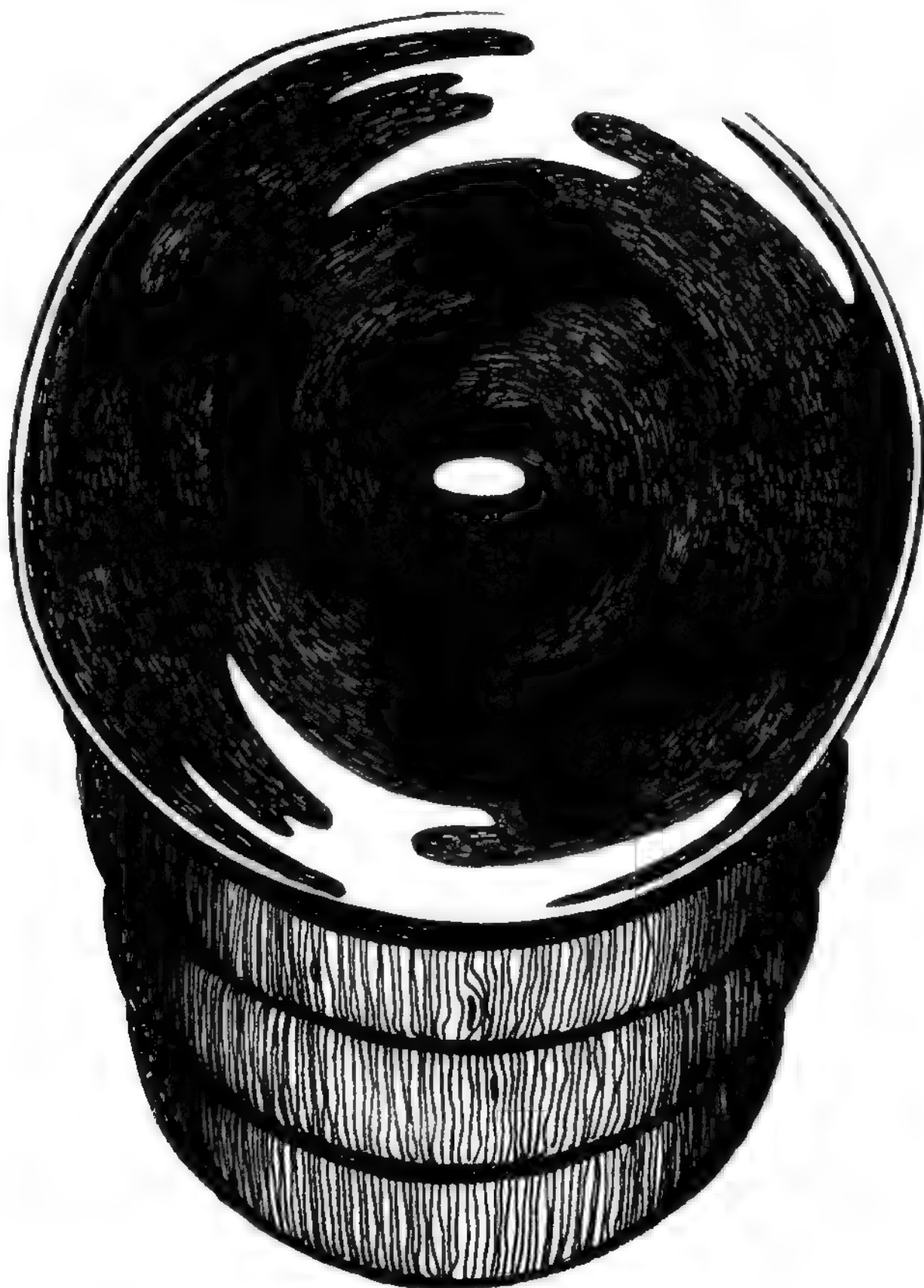
'Crystal-gazing is a particularly refined art,' she said dreamily. 'I do not expect any of you to See when first you peer into the Orb's infinite depths. We shall start by practising relaxing the conscious mind and external eyes.'

Professor Trelawney – Harry Potter and the Prisoner of Azkaban

One of the classic symbols of divination is the crystal ball. The art of divination using crystal balls – or crystallomancy – is an ancient practice. As far back as the 1st century AD, the Roman writer Pliny the Elder described druids in Britain using crystals, and in the Renaissance, John Dee (advisor to Queen Elizabeth I) was known to be a practitioner.

The 19th century saw gazing into crystal balls reach a peak of popularity. The writer Charles Dickens was curious, but Sherlock Holmes creator Arthur Conan Doyle was absolutely convinced of the powers of crystal balls. Up and down the country, serious practitioners and parlour-room dabblers peered into crystal balls seeking out the future, fascinated by the exotic mysteries of crystallo-mancy.

This curiosity continued into the 20th century for those such as Smelly Nelly, a scryer and 'witch' from Paignton in Devon, Southwest England, who used a small, black and rather battered crystal ball to take readings in the wilds of the Devon countryside.



The small crystal ball she used was a moon crystal, specifically used to catch the reflection of the moon on its surface. She then gazed into the moon's mirrored surface and got her reading that way. Smelly Nelly got her name from the very strong perfume she wore to attract the spirits, which Cecil Williamson (the neo-pagan founder of Boscastle's Museum of Witchcraft) claimed you could smell a mile downwind. We're sure the spirits enjoyed the rich aroma upon the bare rocks of Devon's wild countryside.

As a result of the popularity of crystallomancy, books were produced instructing people how to use crystal balls: *A Practical Guide to Crystal Gazing* by John Melville was written at the end of the 19th century as the craze for crystal divination reached its peak. It gave advice on proper crystal-ball technique, and advised taking an infusion of the herb mugwort, or of the herb succory, during the increase of the moon to help you interpret what you saw in the ball.

This was down to some doubtful chemical and biological reasoning (and the magnetic conditions of the blood), which suggested that these herbs and techniques helped obtain the perfect powers of concentration and lucid sight needed to make you a clairvoyant. But, since most of the people peering into crystal balls were hobbyists, it was probably hard for them to see anything most of the time!



Another book by a man who knew all about crystals was *The Magic of Jewels and Charms* by George Fredrick Kunz, published in 1915. Whereas *A Practical Guide to Crystal Gazing* encouraged readers to eat herbs and keep an eye out for the full moon, *The Magic of Jewels and Charms* was a different kind of book, which discussed the legends of stones and the powers different cultures attributed to them. His writing ran the gamut of history and covered stories from all over the globe, exploring the many different cultures in which stones were endowed with a special quality— from the rain-making stones that were part of the special rites among central African tribes, to the quartz beach pebbles that Native Americans prized as talismans.

Kunz wasn't a mystic – he was a gemmologist and an expert in the folklore of stones. He wasn't so much interested in their purported magical powers as

he was by the stones themselves, and his enthusiasm popularised all manner of gems and semi-precious stones.

His obsession began at a young age: Kunz was selling stones to overseas collectors by the age of fourteen. At twenty, he sold four thousand specimens to the University of Minnesota – a job lot that weighed over a ton. He was an intrepid, adventurous type: he collected were-jaguar religious objects (which depicted a supernatural entity from the Olmec civilisation from Mesoamerica) in Mexico and carried a pistol in his lap while hunting for amethysts in Russia. Foreign honours bestowed upon him included being elected as an officer of the Legion of Honour of France, a Knight of the Order of St Olav of Norway and an officer of the Rising Sun of Japan.

He landed a job at Tiffany and Co., the famous New York jewellers, and with his drive, enthusiasm and knowledge, he became the company's vice-president by the time he was twenty-three. At that time there were four precious stones that anyone cared about – diamonds, rubies, emeralds and sapphires – but Kunz introduced many semi-precious stones that were beautiful and also prized by various cultures for their features. Stones such as garnet, tourmaline and aquamarine were introduced into the marketplace by him and he can be credited with fostering public interest in them.



PART 3: PALMS, CARDS AND CUPS OF TEA

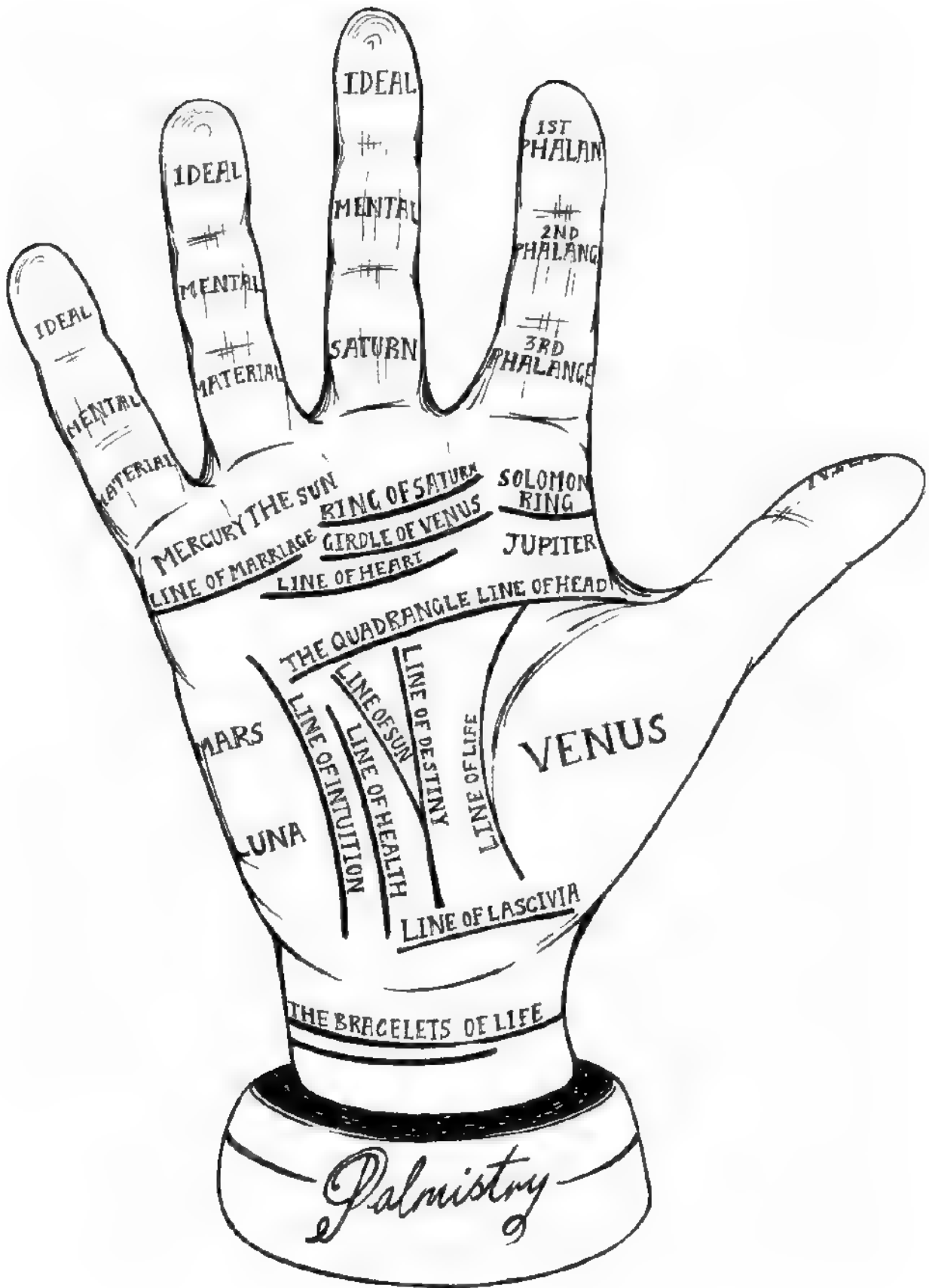
The first Divination lesson of the new term was much less fun; Professor Trelawney was now teaching them palmistry, and she lost no time in informing Harry that he had the shortest life-lines she had ever seen.

Harry Potter and the Prisoner of Azkaban

If you look at your hand, do you just see a few meaningless lines, fingers and a thumb? Or do you see the story of your life laid out before you? For thousands of years, in many different cultures, people have believed just that, as part of the art and science of palmistry.

Palmistry, or chiromancy, first became popular in Western Europe in the 12th century. There is a fortune-telling manuscript from the 14th century that was made in England, but written in Latin, which has a double-page spread of impressively detailed hands – it explains how to interpret your fortune, using the signs we know as palmistry. The lines of the hands are mapped out and each is interpreted in its own way, some of which are rather positive. There are familiar lines like the love line, but there's also a line that runs between your middle and index finger which 'signifies a bloody death'. A line that reaches the middle of a finger signifies a sudden death. Now stop looking at your hands!

There are lines to predict ailments and diseases, such as eye problems and the plague, and others to reveal personality traits, such as courage. Every hand is different and, as such, open to a multitude of interpretations. Based as it is on observation, there is something scientific about palmistry. But how realistic those observations are is completely open to question.



'Here you are,' said the manager, who had climbed a set of steps to take down a thick, black-bound book. 'Unfogging the Future. Very good guide to all your basic fortune-telling methods palmistry, crystal balls, bird entrails ...'

Harry Potter and the Prisoner of Azkaban

A good example of palmistry can be found in a book called *The Old Egyptian Fortune-Teller's Last Legacy*, published in 1775. It purported to be a collection of old Egyptian fortune-telling techniques that far preceded its 18th-century publication date. It was cheaply made, including some crude woodcut illustrations. According to this book, some of the lines of the hand denoted good fortune and prosperity, while others 'predict a woman to be a strumpet'.

The writer was British but seemed keen to exploit Ancient Egypt's mysterious reputation at the time. Alongside palmistry, the book included other unconventional divination methods, such as 'The Wheel of Fortune', which involved pricking a wheel with a pin and interpreting the symbol you picked. Then there was throwing a dice to find out who to marry. And moles on the skin were very important to the person who wrote the book – if you had a mole on your left rib, for a man it meant that he was very cruel and for a woman that she was vain and proud. Even better, a mole on the buttock was said to denote honour for a man and riches for a woman.

Almost inevitably, the book moved into the interpretation of dreams. It stated that if you dreamt of fighting with and destroying serpents, this denoted victory over your enemies. Watch out, Nagini!

Reminiscent of the emergence of criminal phrenology in the 19th century, this book had a section on the 'Art of Physiognomy', about the significance of lines on the face. The idea was that by reading wrinkles, you might find out what kind of person you were.

This book's combination of analysing moles on buttocks, reading the lines on someone's forehead and divining whether someone is a strumpet from a line in their hand seems pretty ridiculous now. But the book was popular and appealed to readers in the 18th century who didn't have a lot of disposable income and didn't own many books.

'Don't complain, this means we've finished palmistry,' Harry muttered back. 'I was getting sick of her flinching every time she looked at my hands.'

Harry Potter and the Prisoner of Azkaban

Like crystal-ball gazing, palmistry became very popular in the 19th century, leading to the creation of lots of palmistry-related items such as life-sized ceramic palmistry hands. These could be used as a teaching aid, with the various black lines and mounts on the palm and wrist explaining their significance. These china hands became popular at home with people who were trying to work out things like what the future would hold or how many children they would have.

The production of ceramic hands showed the desire to turn palmistry from a strange sideshow attraction to a scientific discipline. The reading of palms was part of the broader 19th-century trend for reading the body as a way of telling the future and making judgements of character. It coincided with the rise of phrenology and dubious studies of the shape of criminals' heads as a way of analysing whether criminality could be identified in certain facial features and head shapes. This was all part of the idea that your future and personality were somehow written into your body.

One of the great popularisers of Victorian palmistry was William John Warner, who sometimes went by the name Count Louis le Warner Hamon, though he was even better known as 'Cheiro'. A great self-publicist, he told riveting stories of how he gained his mystic powers, such as when he travelled as a penniless young man to India and met a mystic who took him in and taught him everything he needed to know about the 'Study of the Hand'. He returned to England as a self-styled 'Missionary of Occultism' and pledged he would spend a 'period of three sevens' (twenty-one years) imparting his knowledge.

This story, as recorded in Cheiro's *Confessions: Memoirs of a Modern Seer*, might seem like melodramatic showmanship, but his client list was like a who's who of the great and good of the late 19th and early 20th centuries: Mark Twain, Mata Hari, Oscar Wilde, Thomas Edison and the Prince of Wales. Palmistry was taken seriously and Cheiro was its acclaimed celebrity.

Belief in palmistry is not limited to the past, however. In the 21st century its believers and practitioners have adopted even stranger habits, with stories of people having plastic surgery on their palms, extending their life lines and adding a marriage line, in an effort to ensure that their future is overflowing with luck and riches.



... Professor Trelawney appeared round a corner, muttering to herself as she shuffled a pack of dirty-looking playing cards, reading them as she walked.

‘Two of spades: conflict,’ she murmured, as she passed the place where Harry crouched, hidden. ‘Seven of spades: an ill omen. Ten of spades: violence. Knave of spades: a dark young man, possibly troubled, one who dislikes the questioner.’

Harry Potter and the Half-Blood Prince

One popular method of divination is using a simple pack of cards. Playing cards have been used to tell the future for centuries. The four suits of a standard pack of cards can be used to represent the four seasons: there are fifty-two cards like the fifty-two weeks of the year, and the pips (the symbols that represent the suit) add up to 364 – the same number of days in the year – as long as you add the joker.

But tarot cards are different and are particularly special.

Tarot cards weren’t used for fortune-telling until the 18th century – before then, people would use normal playing cards. Or, alternatively, John Lenthall, a stationer in Fleet Street in London (who was the predominant seller of playing cards in London during the first half of the 18th century), sold divination cards. He sold dozens of types of cards, but the most popular set was advertised as ‘Fortune Telling – pleasantly unfolding the good and bad luck attending human life’.



The cards were incredibly popular and sold well for decades. They had portrayals of famous and archetypal figures. Some were mystical like Merlin,

Doctor Faustus and Nostradamus. Others, such as Herod and Clytemnestra, didn't have such a magical reputation.

Using tarot cards is a little like a 'Magic 8' ball. You begin with a question that you want to answer and then end up with a sentence, somehow generated from one of the cards, that gives you the answer. Some of them come across as just plain weird. For example, if you ask if you are well loved and the cards respond with, 'Children you'll have most for the grave,' it's difficult to know how to interpret that as an answer to that particular question!

As for a classic deck of tarot cards – the kind that feature the Magician, the Hanged Man, the Tower, the Lovers, the Fool and Death – these were used from the mid-15th century onwards, not for divination *per se* but just for playing games. Even today in southern Europe a tarot deck is still primarily used for entertainment, not divination. The opposite is true in English-speaking countries, where they have been tools of divination since around the 18th century.

There are various types of tarot cards, but they are generally more ornate than standard playing cards, with different, more complex symbols, and usually have seventy-two cards in a pack rather than fifty-two.

The pack is divided into two distinct parts. One part is often called the minor arcana - or lesser secrets – which is made up of fifty-six cards. Like a standard deck, there are four suits, but instead of Spades, Hearts, Diamonds and Clubs, tarot might have swords, wands, cups and pentacles.

Then there's the major arcana – the greater secrets. This is what tarot cards are famous for. These twenty-two cards don't have suits – each card is a symbol in its own right: the Empress, the Lovers, the Chariot, Strength, the Hermit, Justice or the Tower.

In more elaborate, hand-made packs of cards from the mid-18th century, each card might have been an impressive artwork in its own right. They would have been hand-coloured and made of cardboard on one side, with a similarly detailed design on the back. The designs for the major cards were more intricate than the designs for the minor cards and were aimed at an expert reader to tell the story of someone's future life. The deck was to be shuffled and laid out.

How the cards played out and were interpreted depended on how they were chosen from the deck and whether they were facing you or the tarot reader. If they were facing you, it meant they were face up, which was good. If they faced the tarot reader, that meant they were face down, which was not as

good. Certain cards were said to speak to major ideas and themes in your life, and the smaller cards to specific times and events.

After all this hard-to-believe palmistry, searching for moles in intimate areas and avoiding the grim reaper in a tarot reading, you might fancy a nice cup of tea. And there are books just for that, too...



The shelves running around the circular walls were crammed with dusty-looking feathers, stubs of candles, many packs of tattered playing cards, countless silvery crystal balls and a huge array of teacups.

Harry Potter and the Prisoner of Azkaban

It was only in the 20th century that the teabag was created – before then, tea leaves were loose, and tasseomancers believed they could see the future in the used leaves in the bottom of a teacup. In cultures without tea, people have had to be more inventive. In the coffee-drinking cultures of Greece or Turkey, diviners studied leftover coffee grinds. Before tea, the curious could also find meaning through molybdomancy (molten metal), carromancy (hot wax) or haruspicy (animal entrails).

When it was initially imported from China to Europe, tea was the preserve of the very rich, but as trade routes grew and tea was cultivated in new countries, prices lowered. This brought tea leaves, and the art of tasseomancy, to the masses. *Tea-Cup Reading and the Art of Fortune-Telling by Tea-Leaves*, by a Highland Seer, was published in 1920, when reading tea leaves was an established popular pastime.

The book was clearly very popular, because there were multiple versions published under its mysterious author name. As well as very detailed descriptions of how to read tea leaves, there were illustrations of sample cups, including some pretty indistinguishable black lumps shown in the

middle of them. For example, if a leaf ended up near the handle, it suggested that the prediction was going to happen sooner, rather than later. It also advised that owls were evil omens and to avoid rats running in front of you for similar reasons. Reading tea leaves was so popular that people started hosting tea-leaf reading parties, and big ceramics manufacturers even started to make fortune-telling teacups just for that purpose.



When Harry and Ron had had their teacups filled, they went back to their table and tried to drink the scalding tea quickly. They swilled the dregs around as Professor Trelawney had instructed, then drained the cups and swapped them.

'Right,' said Ron, as they both opened their books at pages five and six. 'What can you see in mine?'

'A load of soggy brown stuff,' said Harry.

Harry Potter and the Prisoner of Azkaban

One kind of fortune-telling cup and saucer was made by the prestigious maker of bone china Paragon, in the home of quality British ceramics, Stoke-on-Trent. Even in the 1930s, it was clear that this method of divination continued to be popular. Some teacups had signs of the zodiac inscribed on them, some had playing cards and others had a variety of symbols, such as a bell, a baby's dummy, an umbrella and a skull. You'd often need to read an accompanying booklet to decipher the symbols. One example was particularly on-message around its rim: 'Many curious things I see when telling fortunes in your tea'.

The tea-leaf formations for meeting a stranger or making an enemy were almost impossible to distinguish from each other, but maybe these two events could be closely aligned anyway! There was also a cluster of leaves to symbolise that you would be married three times, but no symbol for any other number of times. Well, it has been said that three *is* the magic number.



In stark contrast to reading tea leaves, another route to predicting your future was to consult a fortune-telling doll. These often resembled typical 19th-century Romany fortune-tellers. Dressed in a lace blouse and pleated dress, these dolls were made in the early 19th century and were called ‘peg wooden dolls’. They were very common and nearly all made in one valley in Italy called Val Gardena. The Alpine valley had been a woodworking centre since the 17th century, producing crucifixes, frames, genre sculptures and – in the winter – toys, which were distributed to the UK and US, and across Europe.

The simple, cheap, naked dolls could be modified in lots of ways, and Queen Victoria herself had a collection of 132, dressed as famous opera singers or dancers. It was a process of customising the doll – and the clothing reflected the styles of the day. On a fortune-telling doll, the fan-pleated peasant-style skirt was made of sheets of shaped paper that were folded like an accordion. On each of the fifty or so pieces someone’s fortune was written, but the future could not be revealed until the paper was torn from the skirt!



Even though they were dolls, they weren't created as playthings for a child's bedroom, but as a centrepiece at social events where guests and friends could rip off a strip from the skirt and read their fate. Plans for modifying fortune-telling dolls were in newspapers and books, and they wouldn't just suggest the design of the clothes; they would also advise on the type of social event the dolls could appear at. One suggestion was to use them at a charity bazaar, where a small fee could be paid to pluck at the dress, or – into the 20th century – at occasions like engagement parties.

At the same time, there were suggestions published as to what fortunes to include on the strips of paper. Some supposedly came from a surprising source: Napoleon Bonaparte. Napoleon is said to have consulted *The Oraculum* or 'The Dream Book' on a daily basis after he discovered it while on an expedition in Egypt in 1801. It is said that he found it in a sarcophagus, in which a mummy was holding the book clasped to its chest. Napoleon had a scholar translate it from the hieroglyphics and it was then translated into English in the 1820s. It was republished in various versions throughout the 19th century in English, but whether Napoleon discovered it, and whether it came from a sarcophagus, no one is really sure.

Still, Napoleon's *Oraculum* might have told you that 'The luck that is ordained for you will be coveted by others', or 'Beware of friends who are false and deceitful'. Wherever the advice came from, it was clearly popular, as it's hard to find many examples of doll skirts that have not been torn to shreds. An intact skirt must have held a compelling plethora of fortunes.



Divination is treated with a fair amount of scepticism by the pupils in Professor Sybill Trelawney's class, but premonitions of the future are important to the events of the Harry Potter stories. Fortune-telling really found its audience in the 19th century, when crystal balls, reading tea leaves and tarot cards became hugely popular. This was driven by the parlour-game enthusiasms of Victorian high society, as much as genuine superstition.

But the discovery of the Chinese oracle bones revealed just how ancient a pursuit fortune-telling was, as well as how seriously it was taken by the culture of the Shang. The shamans who were empowered to tell fortunes were

highly revered, as were the Thai Mor Doos. In northern climes, runes encoded the mysteries of the past, present and future into a unique writing system.

The antics of 20th-century witches like Smelly Nelly show that the practice of divination is not confined to previous centuries; in tarot cards especially, it is still thriving in certain corners of the world, even today.



ASTRONOMY

Time to turn our gaze to the stars. The study of the stars has long been undertaken on earth, for as long as we could tilt our heads upwards, but the people looking up at them haven't always seen them in the same way. They have arranged stars into different shapes and invented different meanings for them depending on their culture and time in history. And in the Harry Potter universe, too, there are key characters with strong connections to the science of astronomy.



PART 1: FROM A STAR CHART TO A DOG STAR

They had to study the night skies through their telescopes every Wednesday at midnight and learn the names of different stars and the movements of the planets.

Harry Potter and the Philosopher's Stone

At the edge of the Gobi Desert in Northwest China, near a town called Dunhuang, there is a complex of nearly five hundred caves honeycombing across a cliff face. These once teemed with Buddhist monks, but by the end of the 19th century they had been abandoned for generations and fallen into ruin.

In the late 1800s, an itinerant Daoist monk, Wang Yuanlu, decided to settle there. He appointed himself guardian of the caves and set about preserving and restoring them. One day, he discovered a secret door. What he found behind it has been described as one of the world's greatest archaeological discoveries – the equivalent of stumbling upon Tutankhamun's tomb or tripping over the Dead Sea Scrolls.

The door opened to reveal a hidden room that had been sealed for nearly a thousand years. Inside it was stacked an astonishing treasure trove of information on the culture, religions, linguistics and science of another age – found in tens of thousands of manuscripts, printed documents, paintings and drawings, stacked floor to ceiling. In 1907, a Hungarian-British archaeologist called Aurel Stein also entered the cave after searching for artefacts on the southern Silk Road.

Among the astonishing hoard was an extraordinary manuscript known as the Dunhuang Star Atlas – the earliest known atlas of the night sky. It is a tremendously advanced astrological work made around 700 AD, about the same time as Europe was undergoing its conversion to Christianity. The

manuscript was just short of the length of a full-sized bed and 9½ inches wide, roughly the length of Professor McGonagall's wand.

It is a miracle the star chart survived. Painted in handscroll form, it was read from right to left and unfolded one scene and panel at a time. It was supposed to be studied in an intimate setting by only a few people, but would have been part of a much longer scroll made up of thirteen panels designed to be viewed by multiple people.

The first part of the scroll was about aeromancy, which is divination by clouds. The star map was the second part and showed the Chinese night sky in twelve charts. The final chart was of the north polar region. The map was incredibly detailed. There were 1,345 stars depicted and over 250 of them were named, with explanatory text. It was detailed, and also extremely accurate: modern analysis has shown that the star positions in the hand-drawn atlas are accurate to within a few degrees. At the end of the chart was a representation of a bowman in traditional clothes who is firing an arrow - the God of Thunder, or *Dianshen* in Chinese.

The 1,300-plus stars are represented in either black, red or white and grouped into constellations. Most of these constellations were named, although they have different names from the Western tradition, such as *Laoren* 'the old man' in Chinese (known today as the Carina constellation in the West). By contrast, the constellation of Leo never existed because lions were not known in China; instead, constellations named after warriors, palaces and chariots populated the night skies.

The star chart is not only a very advanced scientific document that holds up well today; it was also used for divination: one could look up into the skies and interpret the spirit world. This practice was so highly prized that the maps were protected state documents – because understanding the stars meant understanding the world.

The emperor at the imperial court would have been surrounded by astronomers recording the nightly celestial movements. Once documented, predictions would have been made from the astronomical notations. For example, a solar eclipse was interpreted as meaning there was a risk of a coup. There were astrological predictions for the descriptions of the twelve divisions of the Chinese year.

Since it portrays a culture of acute scientific sophistication, and provides insights into the beliefs of the Chinese imperial court of over a thousand years

ago, the big question remains: why was it sealed up in a cave in the Gobi Desert?

There is a theory that the rough appearance and handwriting of the document means it was a copy of the original. Even so, the reason why it was stashed in the Gobi Desert is a mystery that sadly remains unsolved.



Though created thousands of miles away and several centuries later, an Anglo-Saxon miscellany made in England around the time of the Norman Conquest of 1066 still featured astronomy heavily. A team of people – who remain uncredited for their phenomenal illustrations – painted each picture of the constellations onto the page first and then inscribed the text carefully around it later.

The book has a section on astronomy, focusing on a constellation that's an old Harry Potter favourite – Sagittarius, the centaur.

And into the clearing came – was it a man, or a horse? To the waist, a man, with red hair and beard, but below that was a horse's gleaming chestnut body with a long, reddish tail.

Harry Potter and the Philosopher's Stone

Sagittarius is rendered with a series of orange-red dots or orbs on the parchment in the shape of a constellation; these were used as the outline of the image and then drawn around to create the shape of a handsome-looking centaur. In this well-preserved image, the centaur is wearing a blue top and has a magnificent cloak flowing from his shoulders. His taut bow and arrow, depicted in rich blues and oranges, is aimed at a goat-like fish, otherwise known as Capricorn, which is leaping off the page, trying to escape.

The reason why the centaur is clothed rather than bare-chested is because the Anglo-Saxons liked to draw people in the costumes of their own day. So

in this case they reproduced Anglo-Saxon dress and hairstyles, but with added horse hooves and tail.

'I know that you have learned the names of the planets and their moons in Astronomy,' said Firenze's calm voice, 'and that you have mapped the stars' progress through the heavens. Centaurs have unravelled the mysteries of these movements over centuries. Our findings teach us that the future may be glimpsed in the sky above us

Harry Potter and the Order of the Phoenix





Atque deam sup hoc nudi pelagoq: uadatur
 on ense sagitta potens solus cussu nec orbem
 Hic iam cumminas exiguu lux tempore presto est
 hoc signu ueniens poterunt pgnosce natus.
 1. am ppe pceptante. licebit uisere nocti
 u. t se se ostendens ostendat scorpis alte
 p ostentore trahens flexum in corporis arcum
 2. am sup hunc cernes ara caput esse minoris
 E t magis erectu adsummu uersarier orbem
 I um se se orion toto iam corpore condec
 E xrema ppe nocte eccepheus conditor alte
 L umboru tenus aprima de palus adumbras

SAGITTARIUS

... Harry saw something that distracted him completely: the silhouette of an enormous shaggy black dog, clearly imprinted against the sky, motionless in the topmost, empty row of seats.

Harry Potter and the Prisoner of Azkaban

Those humid, sweltering days of the northern-hemisphere summer, when it's too hot to do anything, are sometimes called 'dog days'. They are dog days because they are associated with the Dog Star, which rises before the sun in the hottest part of the summer. In ancient Roman and Greek times, these days became associated not just with stifling heat but with thunderstorms, lethargy, bad luck... and mad dogs.

The star is better known as Sirius, which is where we get the name of Sirius Black, Harry's beloved godfather, an Animagus who can turn into a big black dog. Sirius is derived from the Greek *seirios aster*, which means 'scorching star', part of the constellation Canis Major, or 'Great Dog'.

the stars. It's fascinating how a group of stars, millions of light years away, have been grouped to form a particular constellation, according to different systems depending on whether the astronomer lived in China, England or elsewhere. Sirius in particular has a large mythology built around it.

For one brief moment, the great black dog reared on to its hind legs and placed its front paws on Harry's shoulders, but Mrs Weasley shoved Harry away towards the train door, hissing, 'For heaven's sake, act more like a dog, Sirius!'

Harry Potter and the Order of the Phoenix



Astronomy has a clear influence on some of the characters we encounter in the Harry Potter books. In a handwritten note which was made as J.K. Rowling was writing *Philosopher's Stone*, the Professor of Astronomy is recorded as 'Aurelia Sinistra', which then morphed into 'Aurora Sinistra'. 'Aurora' means 'the dawn' and can also refer to the natural phenomenon that occurs near the magnetic poles, creating startling displays of light. 'Sinistra', as well as meaning 'left-hand side', is also the name of a star in the constellation of Ophiuchus, better known as the Serpent Bearer.

As well as Sirius, the Black family has other names of astronomical derivation, including Bellatrix (meaning 'female warrior'), which is a star in the constellation Orion. The other members of the Black family – Pollux, Cygnus, Orion, Alphard, Regulus, Arcturus – all relate to stars in the night sky. And then there is Draco – a constellation in the form of a dragon that snakes around the stars like a Slytherin serpent.

But names in the wizarding world don't just come from the stars; many of the names of people Harry meets have interesting backstories. J.K. Rowling wrote a note by hand listing the subjects studied at Hogwarts and some ideas for the names of the teachers. It is difficult to date, but it was from around the

time of writing *Philosopher's Stone*, and she was clearly already thinking that the Defence Against the Dark Arts teacher would change every year, as she has made a list of different names with the year alongside. Some we know, like Quirrell, Lockhart and Lupin, but others we have never met, like Enid Pettigrew, Oakden Hernshaw and Mylor Silvanus. Of course, Enid Pettigrew shares a second name with Peter Pettigrew, but Enid, Oakden and Mylor never saw the light of day in the published books.



Erud Pettingrew

Guineas Quirrell (1)
Gilderoy Lockhart (2), (6), ~~(7)~~
Remus Lupin (3), (7) Snitch
Erud Pettingrew (4), (6), (7)
Oakden Hershaw (5)

subjects 3rd year

core subjects {
Potions
Transfiguration
Charms
Defence Against the Dark Arts
History of Magic
Astronomy
Herbology

Divination → Harry & Ron
Study of Ancient Runes → Hermione
Arithmancy → Hermione
Care of Magical Creatures → Harry & Ron
Muggle Studies → Hermione

Divination: Erud Pettingrew

Transfiguration	Professor Minerva McGonagall
Charms	Flora Fawcett
Potions	Severus Snape
Defence Against the Dark Arts	Remus Lupin
History of Magic	Cuthbert Binns
Astronomy	Aurelia Snitch
Herbology	Pomona Sprout
Divination	1
Care of Magical Creatures	

~~Erud Pettingrew~~

Lists of the Hogwarts subjects and teachers by J.K. Rowling

by J.K. Rowling

Transfiguration	♀	Prof. Minerva McGonagall
Charms	♂	Prof. Filius Flitwick
Potions	♂	Prof. Severus Snape
Herbology	♀	Prof. Pomona Sprout
D.A.D.A	♂	Prof. Remus Lupin
Astronomy	♀	Prof. Aurora Sinistra
History of Magic	♂	Prof. Cuthbert Bunn
Divination	♂	Prof. M Merope etc
Study of Ancient Runes	♀	Prof. Bathsheda Babbling
Anthromancy	♀	Prof. Septima Vector
Care of Magical Creatures	♂ →	Professor Rufus Hagrid
Muggle Studies	♀	Prof.

Disit

Pi
Vector

Septima
Vector

Fata
The fates
reines
1/2

Hippogriffs

Stormswift
Hothoof
Fleeting

Gibberin
Gibberleggs
also checks
kingdom languages Greek etc

Mylor Silvanus

Rosmerta "good purveyor"
"nude woman"

- 1) Quirell
- 2) Lockhart
- 3) Lupin
- 4) Pettigrew
- 5) Mylor person Oakden Hobday

... Harry looked upwards and saw a velvety black ceiling dotted with stars. He heard Hermione whisper, 'It's bewitched to look like the sky outside, I read about it in Hogwarts: A History.'

Harry Potter and the Philosopher's Stone

Just the thing for Hogwarts First Years: available in the first half of the 19th century, *Urania's Mirror; or A View of the Heavens* was a pack of playing cards, consisting of thirty-two large cards, on which were presented all the constellations visible in the British Empire. Each constellation was drawn with the figure ascribed to it by the ancients, and the stars were perforated so that their natural appearance in the night sky could be seen when held up to any source of light. The brighter the star in the sky, the bigger the hole that was pricked. They were beautiful to look at even without shining a light from behind, but the colours of the cards were incredibly strong and rich.

The original advert for the cards went out in 1824, but ten years later they were still being published – a testament to their popularity. Some of the cards showed more than one constellation. Some were the classical ones we are familiar with, such as Taurus the bull, Draco the dragon, Leo the lion and, one of our favourites, the centaur. There were unusual constellations, too, no longer in use today: a hot-air balloon, an electrostatic generator and the harp of King George III.

The cards were engraved by the map-maker Sidney Hall and hand painted, purportedly having been designed by a woman, who was credited in the advertisements simply as 'a lady'. But the name of the 'lady' was discovered in 1994 when it was found out that an assistant master at Rugby School called Reverend Richard Bloxham had designed them. He hid his identity under the assumption that if their design was credited to a lady, more women would buy them.

If you live amid the din of the city with its excessive artificial light, it is easy to forget that in the past the stars were very present in everyday life for most people, in all their brightness and power. Today they reveal themselves best on a clear night in the countryside.

'Never,' said Hagrid irritably, 'try an' get a straight answer out of a centaur. Ruddy star-gazers. Not interested in anythin' closer'n the moon.'

Harry Potter and the Philosopher's Stone



PART 2: AN ASTROLABE, AN ORRERY AND A CELESTIAL GLOBE

Astronomy can be studied by looking up to the heavens, but it can also be achieved through nifty machines, clever gadgets and even books with wheels!

An astrolabe could tell the time, provide your location, even help make your horoscope, and it was small enough to slip easily into your bag. In fact, a famous 10th-century astronomer called Al Sufi wrote a detailed thesis with over 380 chapters listing 1,001 uses of an astrolabe – from working out the time of the sunrise to calculating the height of a building. It sounds like a smartphone but is actually an ingenious astronomical device that has been around for over a thousand years.

The word ‘astrolabe’ is from the Greek and means ‘star taker’. It was a tool developed in the early centuries AD, used to find the correct latitude, as well as the exact positions of stars and planets. It was a handy device if you were lost at sea. Astrolabes could be used to create two-dimensional maps of the heavens, similar to the star charts that Harry and his classmates were expected to plot in their Astronomy exams.

One exquisite example was made by Muhammad ibn Abi Bakr almost 800 years ago, and was found in modern-day Iran. The astrolabe – with its marked calibrations, symbols and intricate moving parts within it – is about six inches in diameter and could be hung around the neck or shoulder. Its three apertures include one showing the lunar phase and another showing the positions of the sun and the moon in the zodiac. The astrolabe was generally used a lot in the Arabic world to help people find the exact location of Mecca in order to pray. Astrolabes found in the households of Europeans who had never been to sea were status symbols of scientific knowledge.



An astrolabe worked by showing how the sky looked at a specific place at a given time. The moveable components were there so one could draw the sky on the face of the astrolabe, then mark it, so that positions in the sky were easy to find. Once set, much of the sky (both visible and invisible) was represented on the astrolabe, enabling a great many astronomical problems to be solved in a visual way. It was one of the oldest geared instruments, as well as highly complex, and it would have understandably been beyond the comprehension of Harry in his first year at Hogwarts.



By contrast, there's a book that could calculate the movement of the solar system using ingenious moving parts, only using paper. *Astronomicum Caesareum* was written by Petrus Apianus, the son of a shoemaker, born in Saxony in 1495. Apianus was a mathematician, cartographer and astronomer, and, like his previous books, this one showed his considerable talents in those fields. It was the first book to announce that a comet's tail always points away from the sun. But it was the complexity and beauty of the printing itself, made less than 100 years after printing came to the West, that made the book so celebrated.

The book contained a series of rotating paper models known as volvelles. It is almost like a pop-up book, but with a scientific application. Volvelles had been used in medieval manuscripts for astrological workings, but it was very labour intensive to cut out the different shapes, especially if there were twenty-one leaves with moving parts, as was the case with *Astronomicum Caesareum*. The movement of the discs pinned at their centre mimicked the movement of the planets. It was a massive undertaking and it's thought to have taken Apianus years to produce it.



The volvelles meant that readers could do practical experiments with the mathematical ideas introduced in the book. With the aid of the stacked revolving paper discs and a long piece of thread coming from the centre of the volvelle, readers could predict the positions of planets or solve calendar problems. For example, if you had the time of someone's birth and the phase of the moon at the time, you could theoretically work out the hour someone was conceived.

Astronomicum Cæsareum looked spectacular. The volvelle that described how to determine the latitude of the moon was not just paper wheels and thread. The reader spun a stunning, brightly coloured dragon towards the different signs of the zodiac. The book was a huge success – but it wasn't cheap. It was so complex, detailed and packed with hand-painted artworks that probably only a hundred or so were made. It's no surprise that the book was eye-wateringly expensive: several thousands of pounds in today's money.

Apianus dedicated the book to the Holy Roman Emperor, Charles V. The title translates as 'Astronomy of the Emperor'. Even the examples that he used

to teach the reader how to work the volvelles related to Charles's birthday. The flattery worked: the Emperor ended up appointing Apianus as court mathematician and made him an Imperial Count Palatine. The book made his fortune and sealed his fame, giving Apianus (a shoemaker's son) huge social standing. It remains one of the greatest achievements in Renaissance printing.



... there were cabinets full of little lacquered boxes, cases full of gold-embossed books, shelves of orbs and celestial globes and many flourishing pot plants in brass containers: in fact, the room looked like a cross between a magical antique shop and a conservatory.

Harry Potter and the Half-Blood Prince

Born in Venice in 1650, Vincenzo Coronelli was a bright scholar who excelled in the study of astrology and cartography. He published 140 separate works in his lifetime, the first when he was just sixteen years old, but he is revered today as the most celebrated globe-maker of all time. The leading society devoted to the study of globes – the Coronelli Society – is even named after him.

Coronelli was a Franciscan monk and also the cosmographer to the Serene Republic of Venice, with workshops there and in Paris. His work placed him at the centre of public life and proved a successful commercial enterprise. Venice in particular was a leading maritime state in need of this type of mapping, and it had the wealth necessary to produce such globes. Coronelli's workshop was located in his convent.



Coronelli's globe-making fame was assured after he made two massive, ornate globes for Louis XIV in the 1680s; they were so large that they were fitted with doors and over a dozen people could fit inside them. He made smaller globes, but some were still huge, requiring six muscly men to move them; others were suitable for a table-top. He often collaborated with Jean-Baptiste Nolin, engraver to the French Crown. Nolin took Coronelli's draft maps and engraved beautiful baroque figures of animals, men and mythical creatures shown in constant dialogue as they moved across the sky. Some even contained information about the wind direction.

A celestial globe often accompanied a terrestrial globe and was a mark of intelligence and curiosity: membership of a scientific circle. But celestial globes predated terrestrial globes by many years. Before there was consensus on the shape of the earth, people looked up and thought the stars seemed to form a sphere around the earth.

Coronelli's globes tended to be astronomically accurate, with the constellations in the correct position in relation to the equinoxes for the given year. Sometimes, though, Coronelli added a few extra constellations for good measure, such as 'the Dolphin' or 'Dauphin'. This is a reference to the Dauphin of France, the dynastic title given to the heir apparent to the French throne.

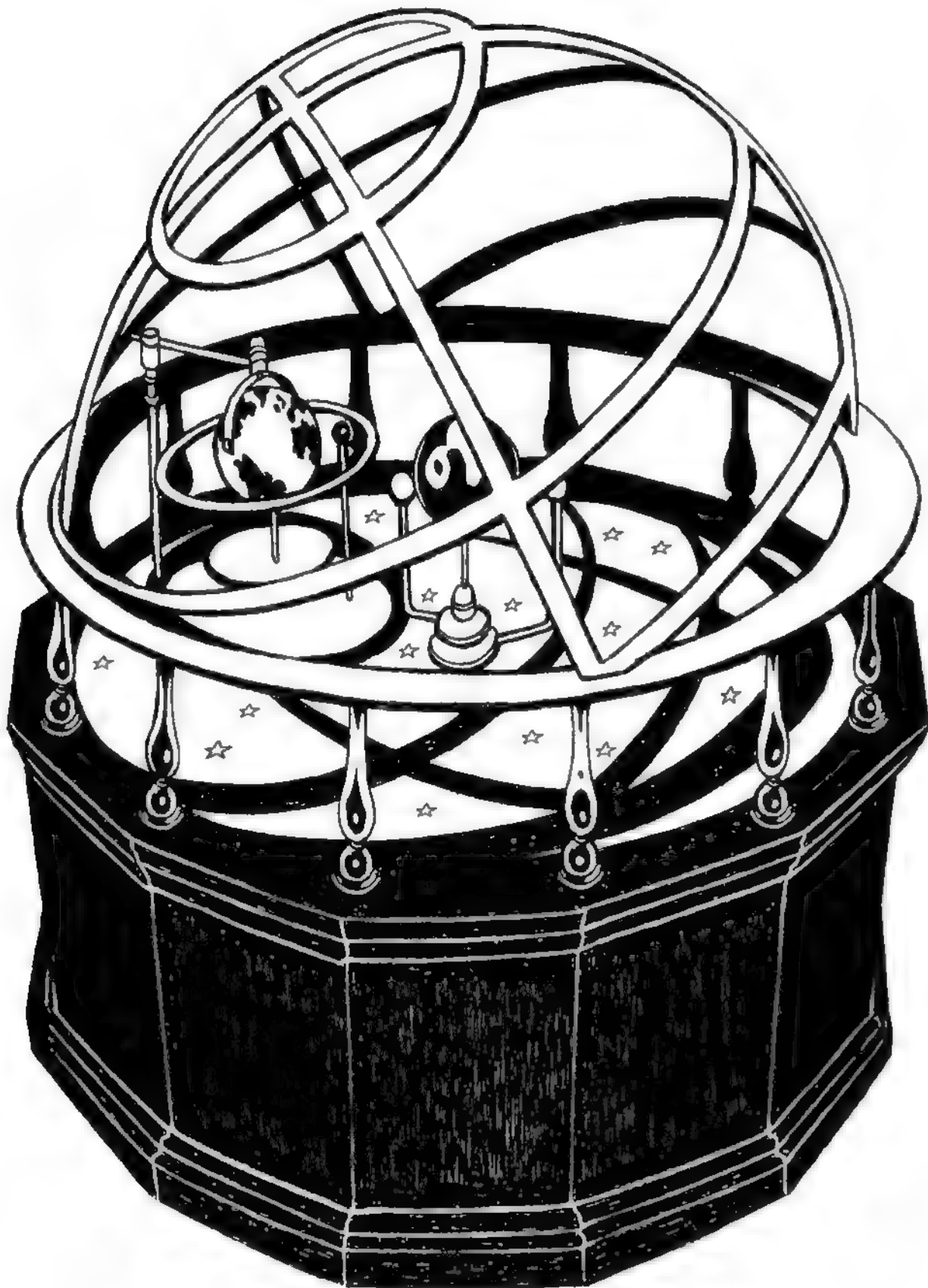


She waved her wand and the lamps went out. The fire was the only source of light now. Professor Trelawney bent down, and lifted, from under her chair, a miniature model of the solar system, contained within a glass dome. It was a beautiful thing; each of the moons glimmered in place around the nine planets and the fiery sun, all of them hanging in thin air beneath the glass.

Harry Potter and the Goblet of Fire

An orrery is a moving mechanical model of the solar system – an early version of a planetarium. Orreries were first developed in the early 18th century by Englishman George Graham, who named them after his patron, the Earl of Orrery.

Orreries held a clockwork mechanism composed of a series of arcs, which measured the celestial longitude and latitude around the earth. They depicted the earth and the moon and the way the moon goes around the earth in relation to two other planets. There was a handle for people to turn in order to get the planets to rotate around the earth in a beautiful clockwork motion. It gave people a new perspective on the earth and the solar system; a view which has otherwise only ever been seen by astronauts and satellites in modern times.



These fascinating models of the solar system were used to teach people about the motion of the moon and stars and planets around the earth.

An orrery encapsulates the move away from a pre-Enlightenment obsession with the supernatural, and things somehow beyond nature, to understanding nature (and the rules of nature) to develop something new. The stars were being observed for practical purposes rather than to harness any supernatural powers. Orreries are so beautiful in their design and operation that they have a certain magic of their own.

He was sorely tempted, too, by the perfect, moving model of the galaxy in a large glass ball, which would have meant he never had to take another Astronomy lesson.

Harry Potter and the Prisoner of Azkaban



PART 3: HEADS IN THE STARS

Back in the 1300s, Sir John Mandeville was purported to have been an English knight who travelled in Egypt, India and China. His book *Mandeville's Travels* documented strange lands where he encountered cannibals, Amazonian tribes and people who had the heads of dogs. This was entirely fictitious, as was Mandeville, but the story was so fascinating that it was translated into many different languages and copied out repeatedly, becoming renowned throughout medieval Europe. The story is thought to have actually been written by a Frenchman called Jehan la Barbe, or a Fleming called Jan de Langhe.

The book was so popular that it is said to have been used by Christopher Columbus and to have influenced writers like Jonathan Swift, Daniel Defoe and Samuel Taylor Coleridge. One version of the Czech translation contains a fascinating illustration of astronomers standing on the peak of Mount Athos in Greece, gazing at the night sky and holding what look like astrolabes and quadrants. Below them are a different set of people, probably astrologers, holding sticks and writing magical signs in the sand in a type of script that nobody can interpret.

The astonishingly beautiful manuscript would have taken a huge amount of effort to create, using the skills of illuminators, artists and scribes before the invention of the printing press in Western Europe. The process would have taken months and months, probably even longer, but it resulted in something whose beauty is undiminished 600 years later.

The quality of illustration and portraiture contained within medieval manuscripts defies the idea that portraiture as we know it from galleries began in the 15th century. These books contain hundreds of illustrations which, taken on their own, would be regarded as great works of art – all of which have survived in extraordinarily good condition.

The walls were covered with portraits of old headmasters and headmistresses, all of whom were snoozing gently in their frames.

Harry Potter and the Chamber of Secrets



From a fictitious teller of tales to one of the world's greatest ever minds: Leonardo da Vinci. One of his surviving notebooks contains hundreds of pages of notes and working drawings, representing his various observations, relating to all kinds of subjects like engineering and hydraulics. There are also early sketches that were used as templates for later portraits and drawings.

The great inventor, scientist and artist made copious notes on everything throughout his life: underwater breathing apparatus, musical organs with mechanical voices and theories on the flight of birds – even shopping lists. Da Vinci gathered information and was trying to make sense of the world around him. What makes the notes even more interesting is that he made them in mirror handwriting, written back to front. No one knows why he chose to record his notes in mirror writing. Some thought it was because he wanted to hide controversial views from the church, others that – because he was left-handed – writing backwards meant he wouldn't smudge his ink. No one knows for sure.

Once he'd mastered the skill, perhaps it was obvious to him that he should continue that way; private notes for his own purposes. Why would he care if they were difficult to read? Nevertheless, they give an incredible insight into the mind of one of the greatest thinkers of all time.

In medieval Europe the mainstream astronomical theory was that the sun and the moon circled the earth. With the Renaissance, many scientists and thinkers (including Leonardo) were questioning what was going on in the night sky. How big was the moon? Was its surface smooth and rough – and why did it shine?

In one of his notes, da Vinci drew a diagram and it showed the earth at the centre of the system, around which orbits the moon *and* the sun. It is understandable that, before the invention of the telescope, da Vinci would get this wrong. An accompanying illustration showed a view from above of the earth and the moon, and the moon is covered with water, a little like a convex mirror, because he believed it would reflect light, and one of the motivations for him doing the diagrams was that he was observing the reflective properties of light.

The notebooks represent a highly creative and highly scientific process: da Vinci used his artistic prowess as part of a process of learning about the solar system and the earth's position in relation to other stars and planets. It might be easy, as with other areas of the history of magic, to simply dismiss his work as 'wrong', but that overlooks how vital it is to the development of our knowledge to experiment and speculate in a scientific way – to think things through in a logical way by using our creativity.

Harry watched the cloudy sky, curves of smoke-grey and silver sliding over the face of the white moon. He felt light-headed with amazement at his discoveries.

Harry Potter and the Deathly Hallows



Another great thinker, and one of the true giants of astronomy, is Johannes Kepler, creator of the *Rudolphine Tables*. Kepler's life was dominated by the struggle between science and superstition: his patron was obsessed with alchemy, his contemporaries with astrology, and his mother was even accused of witchcraft.

Born 125 years after the birth of da Vinci, in Germany in 1571, Johannes Kepler was a student when a controversial new theory put forward by a Polish astronomer called Copernicus began to gain ground. Copernicus

claimed that the earth orbited the sun, and that planets' paths were not in perfect circles, nor at constant speeds. Kepler's findings confirmed this theory and subsequently became known as Kepler's Laws.

Today, his laws not only describe planetary motion, but also determine the orbits of satellites and space stations. Kepler lived during the reign of the Holy Roman Emperor, Rudolf II, and was the astronomer at his court. Rudolf II also happened to be very interested in the occult and the supernatural.

Like other notable people dabbling in science and magic during this period, the Emperor Rudolf was on a quest to find the Philosopher's Stone, and had a private laboratory in which to conduct experiments. His interest in astrology led him to hire the famous seer Nostradamus to prepare his horoscope – at a time when astrology and astronomy were almost the same thing: magic mixed with science.

In this mysticism-obsessed court in Prague, Kepler also met Tycho Brahe, often described as the greatest and most accurate astronomer to make observations without a telescope. It was Brahe's recording of the position of 777 of the brightest stars that formed the basis of what has become known as the *Rudolphine Tables*.

Although the star tables Brahe created were being researched for supernatural purposes, they still had a tangible scientific importance. After Brahe died in 1601, Kepler took over: the astronomical catalogue had created worldwide interest, and the tables were seen as their most important work. But writing the book was an uphill struggle...

Constantly travelling, and in the midst of the Thirty Years' War, Kepler struggled to get paid for his work: trying to get close to court at a time of great upheaval was difficult. He ended up with a fraction of what he was owed and paid for a large portion of the original printing himself. He ended up having this situation depicted in the frontispiece of the book, which has the eagle of the Holy Roman Empire at the top of the temple of Urania. Coins are dropping slowly out of its mouth, showing the patronage of the Holy Roman Empire, with poor old Kepler working alone by candlelight. The money isn't quite reaching him, but he is still working very diligently.

Getting money out of the emperor wasn't Kepler's only problem. Just as his work on the stars stood at the intersection of science and magic, his next challenge was the clash of superstition and reason. When Kepler's mother was accused of witchcraft it started a six-year ordeal for a crime which was punishable by execution. For the last fourteen months of her imprisonment

she was chained to the floor of a prison cell. With his mother accused of poisoning, paralysing a child's arm by touching it and turning herself into a cat, Kepler had to use logic and reason to win the case and free her.

In 1627, twenty years after the death of Tycho Brahe, the *Rudolphine Tables* were finally published. It was a massive achievement, containing the position of 1,005 stars, and is the most accurate star catalogue of the pre-telescope era. Kepler's extremely eventful and complicated life stands as a testament to developing a scientific method in the face of superstition.

'Lie back on the floor,' said Firenze in his calm voice, 'and observe the heavens. Here is written, for those who can see, the fortune of our races.'

Harry Potter and the Order of the Phoenix

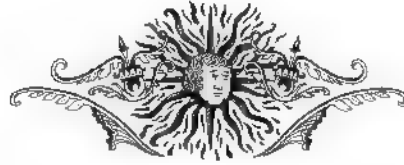


The study of the stars has fascinated people for centuries and has found its way into many beautiful records of the night sky: from the ancient Dunhuang star atlas to the celestial globes made in 17th-century Venice. Astronomy also holds a special place in the wizarding world, since it is such a rich source of inspiration and identity in Harry Potter's life at Hogwarts, and beyond.

The subject is exceptional for its development of scientific understanding through quasi-magical exploration, often binding astrology and astronomy tightly together into one practice. The tools men and women have created to read them over the centuries – in the form of astrolabes and orreries – were beautiful products of human craftsmanship.

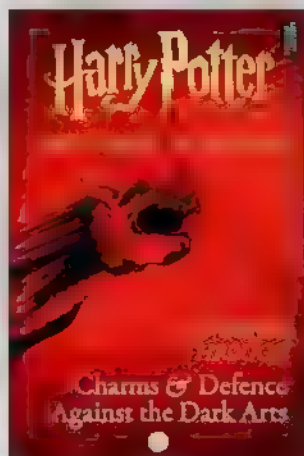
The books produced in service to astronomy are worthy of all our study, whether for their deployment of bespoke rotating paper craft or their beautiful illustrations fit for any national gallery. Leonardo da Vinci's handwritten astronomical notebook is a treasure trove of observation and creative thinking, and his mirror-writing as strange and alluring as Tom

Riddle's diary. And, as we've seen, the names of the stars and planets themselves are present throughout the wizarding world, from teacher Aurora Sinistra to Harry's Animagus godfather himself, Sirius Black.



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